

CLAIMS

WHAT IS CLAIMED IS:

1. An ultra-wideband communication system for a power grid, comprising:
an ultra-wideband transmitter structured to transmit an ultra-wideband signal through the power grid; and
an ultra-wideband receiver structured to receive the ultra-wideband signal from the power grid.
2. The ultra-wideband communication system of claim 1, wherein the ultra-wideband signal comprises a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds.
3. The ultra-wideband communication system of claim 1, wherein the ultra-wideband signal comprises a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds and a power that can range between about +30 power decibels to about -60 power decibels, as measured at a single frequency.
4. The ultra-wideband communication system of claim 1, further comprising at least two ultra-wideband bridges structured to selectively receive and transmit

the ultra-wideband signal around a transformer.

5. The ultra-wideband communication system of claim 1, further comprising at least two ultra-wideband bridges, with each ultra-wideband bridge comprising an ultra-wideband pulse modulator and an ultra-wideband pulse demodulator.

6. The ultra-wideband communication system of claim 1, wherein the power grid comprises:

a power plant structured to generate electricity;

a transmission substation;

a distribution substation;

a residential transformer; and

a power line structured to transmit electricity from the power plant to each of the transmission substation, distribution substation and the residential transformer.

7. The ultra-wideband communication system of claim 6, further comprising:

at least two ultra-wideband bridges positioned adjacent to each of the transmission substation, the distribution substation, and the residential transformer; and

wherein the at least two ultra-wideband bridges are structured to selectively receive and transmit the ultra-wideband signal around the transmission substation, the distribution substation, and the residential transformer.

8. The ultra-wideband communication system of claim 1, further comprising:
means for adjusting the ultra-wideband signal to optimize transmission of
the ultra-wideband signal through the power grid.
9. A method of transmitting a plurality of ultra-wideband pulses through a
power grid, the method comprising the steps of:
introducing the plurality of ultra-wideband pulses into a power line;
receiving the plurality of ultra-wideband pulses from the power line at a
first ultra-wideband device located adjacent to a power grid transformer; and
transmitting the plurality of ultra-wideband pulses from the first ultra-
wideband device to a second ultra-wideband device, so that the plurality of ultra-
wideband pulses go around the power grid transformer.
10. The method of claim 9, further comprising the step of:
re-introducing the plurality of ultra-wideband pulses into the power line
subsequent to going around the power grid transformer.
11. The method of claim 9, further comprising the steps of:
repeating the steps of receiving and transmitting so that the plurality of
ultra-wideband pulses go around selected power grid transformers; and
repeating the steps of re-introducing the plurality of ultra-wideband pulses
into the power line subsequent to going around the selected power grid

transformers.

12. The method of claim 9, wherein each of the plurality of ultra-wideband pulses comprise a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds.

13. The method of claim 9, wherein each of the plurality of ultra-wideband pulses comprise a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds and a power that can range between about +30 power decibels to about -60 power decibels, as measured at a single frequency.

14. A method of transmitting a plurality of ultra-wideband pulses through a power grid, the method comprising the steps of:

means for introducing the plurality of ultra-wideband pulses into a power line;

means for receiving the plurality of ultra-wideband pulses from the power line at a first ultra-wideband device located adjacent to a power grid transformer; and

means for transmitting the plurality of ultra-wideband pulses from the first ultra-wideband device to a second ultra-wideband device, so that the plurality of ultra-wideband pulses go around the power grid transformer.

15. The method of claim 14, further comprising the step of:
- means for re-introducing the plurality of ultra-wideband pulses into the power line subsequent to going around the power grid transformer.
16. The method of claim 14, further comprising the steps of:
- means for repeating the steps of receiving and transmitting so that the plurality of ultra-wideband pulses go around selected power grid transformers;
- and
- means for repeating the steps of re-introducing the plurality of ultra-wideband pulses into the power line subsequent to going around the selected power grid transformers.
17. An ultra-wideband bridging system, comprising:
- at least two ultra-wideband devices positioned adjacent to a power grid apparatus, the at least two ultra-wideband devices structured to selectively receive and transmit a plurality of ultra-wideband pulses so that the power grid apparatus is bypassed.
18. The ultra-wideband bridging system of claim 17, wherein the power grid apparatus is selected from a group consisting of: a transmission substation, a distribution substation, an industrial substation, a pad transformer, a pole transformer, and a residential transformer.

19. The ultra-wideband bridging system of claim 17, wherein the each of the at least two ultra-wideband devices comprises an ultra-wideband modulator, an ultra-wideband demodulator, and a coupler structured to selectively receive and transmit the plurality of ultra-wideband pulses through a power line.

20. The ultra-wideband bridging system of claim 17, wherein each of the plurality of ultra-wideband pulses comprise a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds.

21. The ultra-wideband bridging system of claim 17, wherein each of the plurality of ultra-wideband pulses comprise a pulse of electromagnetic energy having a duration that can range between about 10 picoseconds to about 10 milliseconds and a power that can range between about +30 power decibels to about -60 power decibels, as measured at a single frequency.